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IS 3248 (1993): Canned Tomatoes [FAD 10: Processed Fruits and Vegetable Products]



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IS 3248 : 1993

भारतीय मानक

REAFFIRMED

डिब्बा बन्द टमाटर — विशिष्ट

(पहला पुनरीक्षण)

Indian Standard

CANNED TOMATOES — SPECIFICATION

(*First Revision*)

UDC 664.843.65 : 635.64

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

— May 1993

Price Group 3

AMENDMENT NO. 1 MAY 1996
TO
IS 3248 : 1993 CANNED TOMATOES — SPECIFICATION
(First Revision)

(*Foreword*) — Add the following before the last para:

‘A scheme for labelling environment friendly products known as ECO-Mark has been introduced at the instance of the Ministry of Environment and Forests (MEF), Government of India. The ECO-Mark shall be administered by the Bureau of Indian Standards (BIS) under the *BIS Act*, 1986 as per the Resolution No. 71 dated 20 February 1991 and Resolution No. 425 dated 28 October 1992 published in the Gazette of the Government of India. For a product to be eligible for marking with the ECO-Mark it shall also carry the Standard Mark of BIS for quality besides meeting additional environment friendly (EF) requirements. The environment friendly requirements for canned tomatoes are, therefore, included through Amendment No. 1 to this standard.

This amendment is based on the Gazette Notification No. 624 (E) dated 6 September 1995 for Labelling Beverages, Infant Foods, Processed Fruits and Vegetable Products as environment friendly, published in the Gazette of the Government of India.’

(*Page 3, clause 4.11*) — Add the following new matter after 4.11:

‘4.12 Additional Requirements for ECO-Mark

4.12.1 General Requirements

4.12.1.1 The product shall conform to the requirements prescribed under 4.1 to 4.11.

4.12.1.2 The manufacturer shall produce the consent clearance as per the provisions of *Water (PCP) Act*, 1974, *Water (PCP) Cess Act*, 1977 and *Air (PCP) Act*, 1981 along with the authorization if required under *Environment (Protection) Act*, 1986 and the Rules made thereunder to the Bureau of Indian Standards while applying for the ECO-Mark and the product shall also be in accordance with the *Prevention of Food Adulteration Act*, 1954 and the Rules made thereunder. Additionally, FPO 1955 (Fruit Product Order) framed under *Essential Commodities Act*, 1955, *Standards of Weights and Measures Act*, 1977 requirements wherever applicable has to be complied with.

Amend No. 1 to IS 3248 : 1993

4.12.1.3 The product/packaging may also display in brief the criteria based on which the products has been labelled environment friendly.

4.12.1.4 The material used for product packing shall be recyclable or biodegradable.

4.12.1.5 The date of packing and date of expiry shall be declared on the product/package by the manufacturer.

4.12.1.6 The product shall be microbiologically safe when tested as per IS 5403 : 1969 and IS 5887 (Part 5) : 1976 and shall be free from bacterial and fungal toxins.

4.12.1.7 The pesticide residues (if any) in the product shall not exceed the limit as prescribed in *PFA Act*, 1954 and the rules made thereunder.

4.12.1.8 The product/package or leaflet accompanying it may display instructions of proper use, storage and transport (including refrigeration temperature compliance) so as to maximise the product performance, safety and minimise wastage.

4.12.2 Specific Requirements

4.12.2.1 The product shall not contain any of the heavy metal contaminants in excess of the quantities prescribed in Table 2.'

(Page 3, clause 5.2.1) — Add the following new clause after 5.2.1:

'5.3 ECO-Mark

The product may also be marked with the ECO-Mark, the details of which may be obtained from the Bureau of Indian Standards.'

(Page 4, Annex A) — Add the following new references:

<i>'IS No.</i>	<i>Title</i>
5403 : 1969	Methods for yeast and mould count of foodstuffs
5887 (Part 5) : 1976	Methods for detection of bacteria responsible for food poisoning : Part 5 Isolation, identification and enumeration of <i>Vibrio Cholerae</i> and <i>Vibrio Parahaemolyticus</i> (first revision)'

(FAD 10)

Reprography Unit, BIS, New Delhi, India

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Processed Fruits and Vegetable Products Sectional Committee had been approved by the Food and Agriculture Division Council.

Canned tomatoes occupy an important place among the processed fruits and vegetables. There is ample scope for the development of trade in this product both within the country and abroad. It is, however, necessary to ensure the quality of the product, if the demand is to be maintained and further developed.

In order to ensure proper quality, it is necessary to have strict quality control based on specifications. Therefore, an Indian Standard specification for this product was first published in 1965. The first revision has been taken up to update its requirements taking into consideration the Codex Standard for canned tomatoes CODEX STAN 13-1981. The EEC Regulation No. 1764/86 of 27 May 1986 on Minimum Quality Requirement for Tomato Based Product Eligible for production and EEC Regulation No. 2318/89 of 28 July 1989 amending the Regulation (EEC) No. 1764/86 have also been considered and the requirements of this standard have been aligned to the EEC Regulation to facilitate trade in EEC countries.

In the preparation of this standard, due consideration has been given to the provisions of the *Prevention of Food Adulteration Act*, 1954 and the *Rules*, framed thereunder, and also the *Fruit Product Order*, 1955. However, this standard is subject to the restrictions imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CANNED TOMATOES — SPECIFICATION

(*First Revision*)

1 SCOPE

1.1 This standard prescribes the requirements for canned tomatoes (*Lycopersicum esculentum* Mill).

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Preserved, Whole, Peeled Tomatoes

Peeled tomatoes of suitable varieties having undergone a heat treatment, packed in hermetically sealed containers with or without added water or tomato juice.

3.2 Preserved, Non-whole, Peeled Tomatoes

Pieces of peeled tomatoes of suitable varieties having undergone a heat treatment, packed in hermetically sealed containers with or without added water or tomato juice.

3.3 Preserved, Whole, Unpeeled Tomatoes

Unpeeled tomatoes of suitable varieties having undergone a heat treatment, packed in hermetically sealed containers with or without added water or tomato juice.

3.4 Preserved, Non-whole, Unpeeled Tomatoes

Pieces of unpeeled tomatoes of suitable varieties having undergone a heat treatment, packed in hermetically sealed containers with or without added water or tomato juice.

3.5 Head Space

The distance between the top of the double seam and the level of the surface of the contents.

3.6 Cut-Out Juice

The juice obtained after cutting open the can and draining the product.

3.7 Absence of Defects

The degree of freedom from extraneous material, such as remnants of peel (in peeled

tomatoes), core and other inedible matter, and also freedom from damage due to mechanical injury.

3.8 Blemished Units

Units that are blemished with some injury caused by scab, hail, frost, sunburn, insect damage or physiological disorder, black spots, or enzyme activity on the surface or any other abnormality readily visible to the naked eye to a noticeable degree.

4 REQUIREMENTS**4.1 Hygienic Requirements**

The material shall be prepared and handled under strict hygienic conditions which have been laid down in IS 6542 : 1972.

4.2 General Requirements

Canned tomatoes shall be prepared from selected, fresh, washed and clean, firm and ripe tomatoes of suitable variety and uniform shape. These shall be practically free from blemished and extraneous matter.

4.3 The product shall be free from artificial colouring matter and flavouring agents.

4.3.1 The product may however contain natural spices, spice oils, aromatic herbs and their extracts, natural aromas and seasoning.

4.4 Styles

Tomatoes used for the purpose of canning shall be of the following styles:

- a) Peeled, that is, tomatoes which are scalded, peeled and canned whole or non-whole; and
- b) Unpeeled, that is, tomatoes packed whole or as non-whole without prior scalding and peeling.

4.5 Types of Pack

Any of the following may be used .

4.5.1 Regular pack with a liquid medium added.

4.5.2 Solid pack without any added liquid.

4.6 Requirements for Covering Media

4.6.1 Canned tomatoes may be packed in any of the following media:

- a) Tomato juice (*see* IS 3881)
- b) Water
- c) Tomato puree (*see* IS 3883)
- d) Tomato paste (*see* IS 3884)

4.6.2 The quantity of added common salt must not exceed 3 percent of the net mass when tested by the method prescribed in Annex B. When determining the quantity of added common salt, the natural content of chlorides shall be considered as equal to 2 percent of the dry mass content. Dry mass content shall be tested by the method prescribed in IS 5781 : 1993).

4.6.3 Calcium chloride may be added as a firming agent. If it is added, total calcium-ion content must not exceed 0.045 percent in whole style and 0.080 percent in non-whole style.

4.6.4 The pH of the covering liquid shall be not higher than 4.5.

4.7 Requirements for the Finished Product

Canned tomatoes on opening shall display the following characteristics.

4.7.1 Colour

The product shall possess a good, practically uniform colour, characteristic of well-matured fruit, practically free from 'green shoulders' or any discolouration due to oxidation, processing and other causes. Uneven distribution of pigment and changes in colour normally associated with proper processing shall not be considered as defects.

4.7.2 Texture and Uniformity of Size

The product shall possess a good texture which means that the product shall be just firm but not hard or unduly soft, and shall be characteristic of tomatoes of proper stage of maturity. The product shall be practically uniform in size.

4.7.3 Taste and Flavour

Tomatoes shall be free from flavours and odours foreign to the product and their colour shall be characteristic for the variety used, properly processed.

4.7.4 Absence of Defects

The product shall be practically free from defects. The peeled product shall be virtually free from peel. In the unpeeled product, the peel should be virtually intact.

4.7.4.1 The product shall be considered to comply with the requirements when the following tolerances given for 1 kg net mass are not exceeded:

- a) blemishes: 3.5 cm² aggregate area;
- b) presence of peel (peeled tomatoes)
 - whole style: 30 cm² aggregate area;
 - non-whole: 125 cm² aggregate area;
- c) absence of peel (unpeeled tomatoes)
 - whole style: 30 cm² aggregate area;
 - non-whole: 125 cm² aggregate area.

4.8 The product shall also conform to the requirements prescribed in Table 1.

4.9 It shall not contain metallic contaminants in excess of the quantities specified in Table 2.

Table 1 Requirements for Canned Tomatoes

(Clause 4.8)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Annex of This Standard	Cl No. of IS 2860 : 1964
(1)	(2)	(3)	(4)	(5)
i)	Vacuum in the can, in mm, <i>Min</i>	Negative	—	5
ii)	Head space in the can in mm, <i>Max</i>	7	—	6
iii)	Drained mass of the content of the can as percentage of the net mass, <i>Min</i>	56	—	7
iv)	Mould count	Not in excess of 45 percent of the fields examined	D	—

Table 2 Limits for Metallic Contaminants in Canned Tomatoes
(Clause 4.9)

SI No.	Characteristic	Requirement	Method of Test, Ref to CI No. of IS 2860 : 1964
(1)	(2)	(3)	(4)
i)	Arsenic, parts per million, <i>Min</i>	1.0	13
ii)	Lead, parts per million, <i>Max</i>	1.0	14
iii)	Copper, parts per million, <i>Min</i>	30	15
iv)	Zinc, parts per million, <i>Max</i>	19	16
v)	Tin, parts per million, <i>Max</i>	250	17

4.10 Minimum Fill

Containers shall be filled as commercially practicable. However, the product shall occupy not less than 90 percent of the water capacity of the container when tested in accordance with the method prescribed in Annex C. The water capacity of the container is the volume of distilled water at 27°C which the sealed container will hold when completely filled.

4.10.1 When the product is packed in glass containers, the water capacity shall be reduced by 20 ml.

4.11 Microbiological Requirements

When tested by the method prescribed in 18 of IS 2860 : 1964 the product shall be : (a) free from microorganisms capable of development under normal conditions of storage, (b) shall not contain substances originating from microorganisms which may represent a hazard to health.

5 PACKING AND MARKING

5.1 Packing

The product shall be packed either in hermetically sealed open top sanitary cans made from tin plate and inside lacquered or in food grade plastic containers or glass containers, or aseptic packages.

5.2 Marking

5.2.1 Each pack shall be marked with the

following particulars:

- a) Name, type and style of the product with the brand name, if any;
- b) Indication of the source of manufacture;
- c) Net content in grams;
- d) Month and year of manufacture;
- e) Batch or code number, if any;
- f) List of ingredients in descending order;
- g) List of additives, if used;
- h) The words 'Best before.....(Month and year to be indicated)';
- j) Manufacturing licence number; and
- k) Any other details required under the *Standards of Weights and Measures (Packaged Commodities) Rules and Prevention of Food Adulteration Rules, 1955.*

6 SAMPLING

6.1 Representative samples of the product shall be drawn and tested for conformity to this standard by the methods prescribed in IS 2860 : 1964.

7 TESTS

7.1 The samples of canned tomatoes shall be tested for ascertaining conformity of the product to the requirements of this specification by the methods prescribed in clauses 4.6.2, 4.10, 4.11 and col 4 and 5 of Table 1 and col 4 of Table 2.

ANNEX A**(Clause 2)****LIST OF REFERRED INDIAN STANDARDS**

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
2860 : 1964	Methods of sampling and test for processed fruits and vegetables		content under reduced pressure and of water content by azeotropic distillation (<i>first revision</i>)
3881 : 1993	Tomato juice (<i>first revision</i>)		
3883 : 1993	Canned tomato puree (<i>first revision</i>)	6542 : 1972	Code for hygienic conditions for fruit and vegetable canning units
3884 : 1993	Canned tomato paste (<i>first revision</i>)	13815 : 1993	Fruit and vegetable products—Determination of soluble solids content — Refractometric method
5781 : 1993	Fruit and vegetable products—Determination of dry matter		

ANNEX B**(Clause 4.6.2)****DETERMINATION OF SODIUM CHLORIDE****B-0 PRINCIPLE**

A test sample of the product is diluted. An excess of titrated silver nitrate solution is then added. The excess is then standardized with titrated solution of potassium thiocyanate in the presence of ferric ammonium sulphate.

B-1 REAGENTS

B-1.1 Standard Silver Nitrate Solution — 0.1 N.

B-1.2 Pure Nitric Acid

B-1.3 Standard Solution of Ferric Ammonium Sulphate [$\text{NH}_4\text{Fe}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$]

B-1.4 Standard Potassium Thiocyanate Solution — 0.1 N.

B-2 APPARATUS

B-2.1 Analytical Balance

B-2.2 Conical Flask — of 200-ml capacity.

B-2.3 Graduated Pipette — of 10-ml and 20-ml capacity.

B-2.4 Burette — of 25-ml capacity.

B-3 PREPARATION OF SAMPLE

B-3.1 Weigh 300/R g of the product, where R is the total soluble solids content determined by the method prescribed in IS 13815 : 1993.

B-3.2 Transfer product to a 200-ml volumetric flask, using distilled water which has been recently boiled and cooled.

B-3.3 Rinse the weighing vessel with distilled water and transfer the rinse water to the volumetric flask. Make up to the mark with distilled water.

B-3.4 Shake well and filter the solution using a pleated filter.

B-3.5 Transfer 20 ml of the filtrate to a 250-ml conical flask and dilute with 40 to 50 ml of distilled water.

B-4 PROCEDURE

B-4.1 Add about 2 ml of nitric acid (**B-1.2**) and 10 ml (measured with graduated pipette) of standard silver nitrate solution (**B-1.1**). Boil for five minutes, then cool.

B-4.2 Titrate using potassium thiocyanate (**B-1.4**) until the liquid turns a persistent pink colour, after adding a few drops of ferric ammonium sulphate solution (**B-1.3**). An initial determination is made using distilled water (white).

B-5 CALCULATIONS

B-5.1 The difference between the used volumes of nitric acid and potassium thiocyanate

represents the volume of silver nitrate solution used to precipitate the chloride present in the test sample, reduction made for white. 1 ml of silver nitrate solution 0.1 N corresponds to 0.005 85 g of sodium chloride. Express the results in grams of sodium chloride per 100 g of the product.

B-5.2 The natural content of chlorides is fixed arbitrarily as 2 percent of the dry mass content.

Added chlorides = $Cl_T - Cl_{nat}$

Natural chloride content (Cl_{nat}) = $\frac{2 (NTS - Cl_T)}{100}$

where

NTS = dry mass content

Cl_T = total chloride

ANNEX C

(Clause 4.10)

DETERMINATION OF WATER CAPACITY

C-1 GENERAL

This method applies to metal containers and glass containers.

C-2 PROCEDURE

C-2.1 Metal Containers

C-2.1.1 Select a container which is undamaged in all respects.

C-2.1.2 Wash, dry and weigh the empty container after cutting out the lid without removing or altering the height of the double seam.

C-2.1.3 Fill the container with distilled water at 27°C to 4.8 mm vertical distance below the top level of the container, and weigh the container thus filled.

C-2.2 Glass Containers

C-2.2.1 Select a container which is undamaged in all respects.

C-2.2.2 Wash, dry and weigh the empty container.

C-2.2.3 Fill the container with distilled water at 27°C to the level of the top thereof, and weigh the container thus filled.

C-3 CALCULATION AND EXPRESSION OF RESULTS

C-3.1 Metal Containers

Subtract the mass found in C-2.1.2 from the mass found in C-2.1.3. The difference shall be considered to be the mass of water required to fill the container. Results are expressed as ml of water, percent.

C-3.2 Glass Containers

Subtract the mass found in C-2.2.2 from the mass found in C-2.2.3. The difference shall be considered to be the mass of water required to fill the container. Results are expressed as ml of water, percent.

ANNEX D

[Table 1, Item (v)]

ESTIMATION OF MOULD COUNT

D-1 APPARATUS

D-1.1 Howard Mould-Counting Apparatus

D-1.1.1 Howard Mould-Counting Slide

Glass slide of one-piece construction with flat plane circle, about 19 mm in diameter or rectangle 20×15 mm, surrounded by moat and flanked on each side by shoulders 0.1 mm higher than plane surface. Cover glass is supported on shoulders and leaves depth of 0.1 mm between underside of cover glass and plane surface. Central plane, shoulders and cover glass have optically worked surfaces. To facilitate calibration of microscope, new slides are engraved with circle 1.382 mm in diameter or with 2 fine parallel lines 1.382 mm apart.

D-1.1.2 Accessory Disc for Mould Counting

Glass disc fitting into microscope eyepiece, ruled into squares each side of which is equal to one sixth of the diameter of field. Since limiting diaphragm is eyepiece field stop, rulings, equal one sixth of this diaphragm opening. Field viewed on slide with mould counting microscope has diameter of 1.382 mm of magnification of 90 to 125 X.

D-1.2 Compound Microscope

With standardized field of view of 1.382 mm diameter at 90 to 125 X; and equipped with drop-in ocular disc ruled in squares, each of which is one-sixth of field diameter.

D-2 PROCEDURE

D-2.0 General

The tomato puree used shall be diluted with clean mould free water so as to make about 9 percent by mass of total solids (exclusive of salt) in the diluted product.

D-2.1 Clean Howard cell so that Newton's rings are produced between slide and cover glass. Remove cover and with knife blade or scalpel, place portion of well-mixed sample

upon central disc; with same instrument: spread it evenly and cover with glass so as to give uniform distribution. Use enough sample to bring material to edge of dish. (It is of utmost importance that portion be taken from thoroughly-mixed sample and spread evenly over slide disc. Otherwise, when cover slip is put in place, insoluble material, and consequently moulds may be more abundant at centre of mount). Discard any mount showing uneven distribution or absence of Newton's rings, or liquid that has been drawn across meat and between cover glass and shoulder.

D-2.2 Place slide under microscope and examine with such adjustment that each field of view covers 1.5 mm^2 . (This area, which is essential, may frequently be obtained by so adjusting draw-tube that diameter of field becomes 1.382 mm). When such adjustment is not possible, make accessory drop-in ocular diaphragm with aperture accurately cut to necessary size. Diameter of area field of view can be determined by use of stage micrometer. When instrument is properly adjusted, quantity of liquid examined for field is 0.15 mm^3 . Use magnification of 90 to 125 X. In those instances where identifying characteristics of mould filaments are not clearly discernible in standard field, use magnification of approximately 200 X (8 mm objective) to confirm identity of mould filaments previously observed in standard field.

D-2.3 From each of 2 or more mounts examine at least 25 fields taken in such a manner as to be representative of all sections of mount. Observe each field, noting presence or absence of mould filaments and recording results as positive when aggregate length of not more than 3 filaments present exceeds one-sixth of diameter of field.

D-3 CALCULATIONS

D-3.1 Calculate portion of positive fields from results of examination of all observed fields and report as percent fields containing mould filaments.

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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